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PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Improvements in or relating to Toothbrushes

- I, TOMLINSON IRVING MOSELEY, a citizen of the United States of America, of 511 Harrison Street, San Francisco, State of California, United States of America, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—
- 10 This invention relates to toothbrushes of the character in which motion is imparted to the brush element by electrically actuated means.
- 15 In accordance with the present invention, the improved toothbrush comprises a reciprocable member extending into one end of a hollow body and operatively associated with an electric motor mounted in the hollow body whereby operation of the motor will reciprocate the member, a pinion secured to a brush element rotatably carried by a hollow arm connected with the hollow body and into which the outer end of the reciprocable member extends, and rack teeth carried by or connected with the reciprocable member and in mesh with the pinion whereby reciprocation of the member will oscillate the brush element.
- 30 It is the principal object of my present invention to provide a generally improved brushing apparatus having an oscillatory brushing element operated electrically, which apparatus is pleasing in appearance, simple and compact in construction and may be safely employed to efficiently cleanse teeth in the human mouth.
- 35 In actual practice I employ an electrical motor which may be of the vibratory type which is entirely enclosed within a moisture-proof casing or molded dielectric material of pleasing external design, and of a shape that it may be readily grasped in the hand of the user. Detachably
- 45 connected with this casing is a projecting arm carrying an oscillatory brushing element so mechanically connected with the motor that operation of the latter will rapidly oscillate the brushing element.
- 50 This brushing element is readily replaceable so that it may be replaced as desired. A preferred form of the invention is exemplified in the following description and illustrated by way of example in the accompanying drawings, in which:
- 55 Fig. 1 is a perspective view of my improved toothbrush with one-half of the casing removed showing the internal construction thereof.
- 60 Fig. 2 is a plan view of the toothbrush with one-half of the casing removed and with the brush arm in longitudinal section.
- 65 Fig. 3 is a longitudinal sectional view taken on line III—III of Fig. 2.
- 70 Fig. 4 is a transverse sectional view taken on line IV—IV of Fig. 3.
- 75 Fig. 5 is a perspective view of the brush arm.
- Referring more particularly to the accompanying drawings, 10 indicates a toothbrush including a hollow casing 11 of dimensions and configuration that it may comfortably be grasped in the hand of the user. The casing 11 is centrally and longitudinally divided into two halves which are counter parts and which are secured together by screws or other suitable means. When joining the halves, moisture-proof sealing material is applied to their abutting faces to insure that the casing will be moisture-proof. The casing 11 is preferably molded of the material known under the Registered Trade Mark "Bakelite" or other material having similar advantageous characteristics.
- 80 Disposed within the casing and secured therein is an electrical vibratory motor 12, the field winding 14 of which is firmly fastened in one-half of the casing as illustrated in Fig. 2. The current conductors 15 for the motor are led in through one end of the casing in a moisture-proof manner as illustrated. For this purpose a bushing 15a of dielectric material is sealed in an end aperture 15b in the casing.
- 85 Projecting from the end of the casing 11, opposite that in which the current conductors 15 are led, is a hollow metallic ferrule 16 which is square in cross section and having a square opening extending longitudinally therethrough. The inner end of this ferrule 16 nests in a square opening molded in the ends of the two casing halves as illustrated. The inner
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end of the ferrule 16 is provided with a circumscribing flange 17 fitting a groove in the casing halves 11 so as to firmly hold the ferrule 16 against endwise movement.

Reciprocally mounted in the ferrule 16 is a rack 18 likewise square in cross-section and snugly, although slidably, fitting the square bore through the ferrule 16. The inner end of the rack 18 projects into the casing 11 and is secured to the armature 19 of the motor 12. The armature 19 is spring balanced by springs 20 for obvious reasons. The outer end of the rack 18 projects from the outer end of the ferrule 16 and is formed with rack teeth 21 on one side. A brush arm 22 is provided which is formed with a square longitudinal bore 23 slidably fitting over the ferrule 16 so that its inner end will abut against the adjacent end of the casing 11.

The bore of the arm is formed with a keyway 23a adapted to receive a protuberance or key 24 fixed on one side of the ferrule 16 so that the brush arm 22 can only properly fit on the ferrule in one position.

The outer end of the brush arm 22 is formed with a circular hollow socket 25, the center of which is perpendicular to the bore 23 and slightly spaced from one side thereof so that the bore 23 extends substantially tangentially from the socket 25. The toothed end 21 of the rack 18 extends tangentially into the socket 25 to mesh with a pinion 26 formed on a disk-like bristle holder 27 which is rotatably mounted in the socket concentrically thereof. It will be seen that at the outer end of the socket is an annular flange 27a within which the disk-like bristle holder 27 is bearinged.

The pinion 26 abuts against the inner end of the socket and the inner face of the disk-like bristle holder 27 abuts against the outer end of the socket. A pintle 28 is provided which is secured at its inner end in the inner end of the socket and projects outwardly to rotatably receive the bristle holder 27, and acts as a shaft therefor. A snap fastener 29 is secured in the bristle holder 27 which snaps over the outer end of the pintle 28 to hold the bristle holder in its proper position relative to the socket 25. It is obvious that by merely exerting an outward pull on the bristle holder 27, that the fastener 29 will release from the pintle 28 so as to enable the bristle holder to be replaced at will.

To secure the brush arm in position on the ferrule 16, I provide a thumb screw 30 which is threaded through the wall of the arm 22 to engage the ferrule 16 and

secure the brush arm thereon. By loosening this screw, the brush arm may be moved endwise off the ferrule and replaced by another arm, if desired. I contemplate providing more than one arm for each body casing, giving the arms different numbers or otherwise identifying them so that for one family merely one body 11 may be provided with a different arm or bristle holder for each member of the family. It is obvious that it is only necessary to slip the arm over the ferrule and tighten the thumb screw to assemble it for use. As the toothed end of the rack engages the pinion 26, the latter will merely revolve into mesh with the rack, and as the arm will only go on the ferrule in proper position, due to the provision of the keyway 23a and the protuberance 24, there is no possibility of improperly assembling the brush arm on the body.

To commence the motor I have provided a switch 31 consisting of a button 32 secured to a flexible diaphragm 33 embedded at its periphery in the body 11 and sealed therein so that moisture cannot possibly gain entrance into the body through the button 32. The inner end of the button is associated with a movable switch arm 34 of a normally opened switch 35. The other contact of this switch is that indicated by 36, both the contacts 34 and 36 being resiliently mounted in the body as indicated. It is obvious that by depressing the button inwardly with respect to the body, a contact will be made between the points on the arms 34 and 36, completing a circuit through the motor, causing the same to commence reciprocating the armature 19. As this latter is spring balanced, it will be very silent and very rapid in operation, and as it reciprocates, it will reciprocate the rack 18 and thereby oscillate the brush holder 27. As this brushing element 27 has bristles 27b projecting from one end thereof, a very effective and desirable brushing action will be obtained on the teeth.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A toothbrush of the character described, comprising a reciprocable member extending into one end of a hollow body and operatively associated with an electric motor mounted in the hollow body whereby operation of the motor will reciprocate said member, a pinion secured to a brush element rotatably carried by a hollow arm connected with the hollow body and into

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which the outer end of said reciprocable member extends, and rack teeth carried by or connected with said reciprocable member in mesh with said pinion whereby
5 reciprocation of said member will oscillate said brush element.

2. A toothbrush according to claim 1, wherein the brush element is rotatably mounted at the outer end of the hollow
10 arm, said brush element preferably being detachably mounted on said arm.

3. A toothbrush according to claim 1, wherein the reciprocable member extending into one end of the hollow body is
15 connected to the armature of the motor, said armature preferably being spring balanced.

4. A toothbrush according to claim 1 or 3, wherein said motor is a vibratory
20 motor.

5. A toothbrush according to claim 1 or 3, wherein the hollow arm is adapted to be slipped over the outer end of said reciprocable member to enclose the same
25 and is detachably secured to the hollow body.

6. A toothbrush according to any of the preceding claims, having a hollow ferrule secured at its inner end in one end
30 of the hollow body and projecting outwardly therefrom, the reciprocable member extending through said ferrule and reciprocable therein, the hollow arm being adapted to be fitted over the end of
35 said reciprocable member and said ferrule and detachably connected with said ferrule.

7. A toothbrush according to claim 6, wherein said ferrule is square in cross
40 section and a reciprocable member square in cross section is reciprocably mounted

in said ferrule.

8. A toothbrush according to any of the preceding claims, having a rack formed as a part of said reciprocable member and in
45 mesh with the pinion which is relatively fixed to the rotary brush element.

9. A toothbrush according to any of the preceding claims, wherein the hollow body is a separable molded hollow body
50 preferably composed of two complementary or duplicate halves securely connected together in a moisture-proof manner.

10. A toothbrush according to any of the preceding claims, having a switch for the motor mounted within the hollow body and a switch actuating means extending
55 through an opening through one side of the hollow body.

11. A toothbrush according to claim 10, wherein said switch actuating means includes a flexible diaphragm secured at its periphery in the walls of the hollow body surrounding said opening, and a
65 button associated with said switch and secured to said diaphragm and projecting outwardly through said opening.

12. A toothbrush of the character described, having its parts constructed
70 and adapted to operate substantially as herein described with reference to Figures 1 to 5 inclusive of the accompanying drawings.

Dated this 13th day of May, 1938.
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[This Drawing is a reproduction of the Original on a reduced scale.]

